WHAT IS CLAIMED IS:

1. A method of transmitting data of at least two packets to provide inter-packet interleaving, the method comprising the following steps:

inputting data of a first packet, said first packet data comprising a plurality of symbols;

inputting data of a second packet, said second packet data comprising a plurality of symbols;

utilizing a plurality of tones, each tone at a different frequency, to transmit the plurality of first packet data symbols and the plurality of second packet data symbols;

delaying the transmission of successive ones of said first packet data symbols over time; and

delaying the transmission of successive ones of said second packet data symbols over time,

such that during at least one symbol period, said tones are transmitting at least one first packet data symbol and at least one second packet data symbol.

2. The method of claim 1, wherein said plurality of tones include tones having different bit loading.

3. The method of claim 1, wherein each of said plurality of tones transmits a single data symbol during a single symbol period.

4. The method of claim 1, wherein said delaying steps delay each successive symbol by a predefined time period.

5. The method of claim 4, wherein said predefined time period is substantially uniform for all data symbols.

6. The method of claim 5, wherein said predefined time period corresponds to a single symbol time period.

7. The method of claim 1, wherein said packet data is modulated in accordance with DMT modulation.

8. The method of claim 1, wherein said packet data is modulated in accordance with VCMT.

9. The method of claim 5, wherein said first packet data symbols are arranged as one or more diagonal arrangement of symbols when viewed over time.

10. The method of claim 9, wherein said one or more diagonal arrangement of symbols are grouped into a group.

11. The method of claim 9, wherein said second packet data symbols are arranged as one or more diagonal arrangement of symbols when viewed over time, and wherein a first symbol of said first packet diagonal arrangements is transmitted earlier in time with respect to a first symbol of said second packet diagonal arrangements.

12. A method of transmitting data of at least two packets to provide inter-packet interleaving, the method comprising the following steps:

inputting data of a first packet, said first packet data comprising a plurality of symbols;

inputting data of a second packet, said second packet data comprising a plurality of symbols;

utilizing a plurality of modulation codes to transmit the plurality of first packet data symbols and the plurality of second packet data symbols;

delaying the transmission of successive ones of said first packet data symbols over time; and

delaying the transmission of successive ones of said second packet data symbols over time,

such that during at least one symbol period, said modulation codes are transmitting at least one first packet data symbol and at least one second packet data symbol.

13. The method of claim 12, wherein said plurality of modulation codes comprise a set of orthogonal modulation codes.

14. The method of claim 12, wherein each of said plurality of modulation codes transmits a single data symbol during a single symbol period.

15. The method of claim 12, wherein said delaying steps delay each successive symbol by a predefined time period.

16. The method of claim 15, wherein said predefined time period is substantially uniform for all data symbols.

17. The method of claim 16, wherein said predefined time period corresponds to a single symbol time period.

18. The method of claim 12, wherein said packet data is modulated in accordance with CDMA modulation.

19. The method of claim 16, wherein said first packet data symbols are arranged as one or more diagonal arrangement of symbols when viewed over time.

20. The method of claim 19, wherein said one or more diagonal arrangement of symbols are grouped into a group.

21. The method of claim 19, wherein said second packet data symbols are arranged as one or more diagonal arrangement of symbols when viewed over time, and wherein a first symbol of said first packet diagonal arrangement is transmitted earlier in time with respect to a first symbol of said second packet diagonal arrangement.

22. A method of arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding a first portion of said data according to a first error correcting code to produce first encoded data;

encoding a second portion of said data according to a second error correcting code to produce second encoded data;

arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

arranging said second encoded data according to rows, wherein each row corresponds to one of said plurality of tones; and

utilizing said plurality of tones to transmit said first encoded data and said second encoded data.

23. The method of claim 22, wherein said first error correcting code is a Reed-Solomon code.

24. The method of claim 22, wherein said second error correcting code is a TCM code.

25. The method of claim 22, further comprising the following step after the first encoding step:

interleaving said first encoded data, and wherein said arranging step arranges the interleaved first encoded data.

26. A method of arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding a first portion of said data according to a first error correcting code to produce first encoded data;

encoding a second portion of said data according to a second error correcting code to produce second encoded data;

arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

interleaving and arranging said second encoded data such that it is spread over time; and

utilizing said plurality of tones to transmit said first encoded data and said second encoded data.

27. The method of claim 26, wherein said first error correcting code is a Reed-Solomon code.

28. The method of claim 26, wherein said second error correcting code is a TCM code.

29. The method of claim 26, further comprising the following step after the first encoding step:

interleaving said first encoded data, and wherein said arranging step arranges the interleaved first encoded data.

30. A method of arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, said tones corresponding to rows and said symbol periods corresponding to columns, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding said data according to a first error correcting code to produce first encoded data;

interleaving said first encoded data to produce an interleaved data stream;

splitting said interleaved data stream into upper level data and lower level data;

arranging said upper level data along columns;

encoding said lower level data according to a second error correcting code to produce second encoded data;

arranging said second encoded data according to rows; and

utilizing said plurality of tones to transmit said upper level data and said second encoded data.

31. The method of claim 30, further comprising the step of scrambling said interleaved data prior to said splitting step.

32. The method of claim 30, wherein said splitting step operates to assign one bit of said interleaved data stream to said lower level, for each symbol of said data.

33. The method of claim 32, wherein said splitting step operates to assign the first N bits of said interleaved data stream to said lower level, in the case where said data comprises N symbols.

34. The method of claim 30, wherein after said splitting step and prior to said second encoding step, said method includes the step of arranging said lower level data into one or more groups.

35. The method of claim 30, wherein said step of arranging upper level data operates to arrange a predetermined number of bits less than a full amount of data bits in each symbol, and said step of arranging said second encoded data operates to arrange said predetermined number of bits in each symbol.

36. The method of claim 30, wherein prior to said utilizing step, said method includes the step of phase scrambling said upper level data and said second encoded data in accordance with said second encoded data.

37. A method of arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol

during a symbol period, said tones corresponding to rows and said symbol periods corresponding to columns, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding said data according to a first error correcting code to produce first error correcting encoded data;

interleaving said first encoded data to produce an interleaved data stream;

splitting said interleaved data stream into upper level data and lower level data;

arranging said upper level data along columns;

encoding said lower level data according to a second error correcting code to produce second encoded data;

interleaving and arranging said second encoded data such that it is spread over time; and

utilizing said plurality of tones to transmit said upper level data and said second encoded data.

38. A method of arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding a first portion of said data according to a first error correcting code to produce first encoded data;

encoding a second portion of said data according to a second error correcting code to produce second encoded data;

arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

arranging said second encoded data according to rows, wherein each row corresponds to one of said plurality of codes; and

utilizing said plurality of modulation codes to transmit said first encoded data and said second encoded data.

39. The method of claim 38, wherein said first error correcting code is a Reed-Solomon code.

40. The method of claim 38, wherein said second error correcting code is a TCM code.

41. The method of claim 38, further comprising the following step after the first encoding step:

interleaving said first encoded data, and wherein said arranging step arranges the interleaved first encoded data.

42. A method of arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding a first portion of said data according to a first error correcting code to produce first encoded data;

encoding a second portion of said data according to a second error correcting code to produce second encoded data;

arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

interleaving and arranging said second encoded data such that it is spread over time; and

utilizing said plurality of modulation codes to transmit said first encoded data and said second encoded data.

43. The method of claim 42, wherein said first error correcting code is a Reed-Solomon code.

44. The method of claim 42, wherein said second error correcting code is a TCM code.

45. The method of claim 42, further comprising the following step after the first encoding step:

interleaving said first encoded data, and wherein said arranging step arranges the interleaved first encoded data..

46. A method of arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, said modulation codes corresponding to rows and said symbol periods corresponding to columns, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding said data according to a first error correcting code to produce first encoded data;

interleaving said first encoded data to produce an interleaved data stream;

splitting said interleaved data stream into upper level data and lower level data;

arranging said upper level data along columns;

encoding said lower level data according to a second error correcting code to produce second encoded data;

arranging said second encoded data according to rows; and

utilizing said plurality of modulation codes to transmit said upper level data and said second encoded data.

47. The method of claim 46, further comprising the step of scrambling said interleaved data prior to said splitting step.

48. The method of claim 46, wherein said splitting step operates to assign one bit of said interleaved data stream to said lower level, for each symbol of said data.

49. The method of claim 48, wherein said splitting step operates to assign the first N bits of said interleaved data stream to said lower level, in the case where said data comprises N symbols.

50. The method of claim 46, wherein after said splitting step and prior to said second encoding step, said method includes the step of arranging said lower level data into one or more groups.

51. The method of claim 46, wherein said step of arranging upper level data operates to arrange a predetermined number of bits less than a full amount of data bits in each symbol, and said step of arranging said second encoded data operates to arrange said predetermined number of bits in each symbol.

52. The method of claim 46, wherein prior to said utilizing step, said method includes the step of phase scrambling said upper level data and said second encoded data in accordance with said second encoded data.

53. A method of arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, said modulation codes corresponding to rows and said symbol periods corresponding to columns, comprising the following steps:

inputting data comprising a plurality of data symbols;

encoding said data according to a first error correcting code to produce first encoded data;

interleaving said first encoded data to produce an interleaved data stream;

splitting said interleaved data stream into upper level data and lower level data;

arranging said upper level data along columns;

encoding said lower level data according to a second error correcting code to produce second encoded data;

interleaving and arranging said second encoded data such that it is spread over time; and

utilizing said plurality of modulation codes to transmit said upper level data and said second encoded data.

54. The method of claim 4 wherein the step of interleaving and arranging arranges the second encoded data according to one of rows and columns.

55. The method of claim 14 wherein the step of interleaving and arranging arranges the second encoded data according to one of rows and columns.

56. The method of claim 18 wherein the step of interleaving and arranging arranges the second encoded data according to one of rows and columns.

57. The method of claim 28 wherein the step of interleaving and arranging arranges the second encoded data according to one of rows and columns.

58. An apparatus for transmitting data of at least two packets to provide inter-packet interleaving, comprising:

means for inputting data of a first packet, said first packet data comprising a plurality of symbols;

means for inputting data of a second packet, said second packet data comprising a plurality of symbols;

means for utilizing a plurality of tones, each tone at a different frequency, to transmit the plurality of first packet data symbols and the plurality of second packet data symbols;

means for delaying the transmission of successive ones of said first packet data symbols over time; and

means for delaying the transmission of successive ones of said second packet data symbols over time,

such that during at least one symbol period, said tones are transmitting at least one first packet data symbol and at least one second packet data symbol.

59. An apparatus for transmitting data of at least two packets to provide inter-packet interleaving, comprising:

means for inputting data of a first packet, said first packet data comprising a plurality of symbols;

means for inputting data of a second packet, said second packet data comprising a plurality of symbols;

means for utilizing a plurality of modulation codes to transmit the plurality of first packet data symbols and the plurality of second packet data symbols;

means for delaying the transmission of successive ones of said first packet data symbols over time; and

means for delaying the transmission of successive ones of said second packet data symbols over time,

such that during at least one symbol period, said codes are transmitting at least one first packet data symbol and at least one second packet data symbol.

60. An apparatus for arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding a first portion of said data according to a first error correcting code to produce first encoded data;

means for encoding a second portion of said data according to a second error correcting code to produce second encoded data;

means for arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

means for arranging said second encoded data according to rows, wherein each row corresponds to one of said plurality of tones; and

means for utilizing said plurality of tones to transmit said first encoded data and said second encoded data.

61. An apparatus for arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding a first portion of said data according to a first error correcting code to produce first encoded data;

means for encoding a second portion of said data according to a second error correcting code to produce second encoded data;

means for arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

means for interleaving and arranging said second encoded data such that it is spread over time; and

means for utilizing said plurality of tones to transmit said first encoded data and said second encoded data.

62. An apparatus for arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, said tones corresponding to rows and said symbol periods corresponding to columns, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding said data according to a first error correcting code to produce first encoded data;

means for interleaving said first encoded data to produce an interleaved data stream;

means for splitting said interleaved data stream into upper level data and lower level data;

means for arranging said upper level data along columns;

means for encoding said lower level data according to a second error correcting code to produce second encoded data;

means for arranging said second encoded data according to rows; and

means for utilizing said plurality of tones to transmit said upper level data and said second encoded data.

63. An apparatus for arranging and transmitting data in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, said tones corresponding to rows and said symbol periods corresponding to columns, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding said data according to a first code to produce first error correcting encoded data;

means for interleaving said first encoded data to produce an interleaved data stream;

means for splitting said interleaved data stream into upper level data and lower level data;

means for arranging said upper level data along columns;

means for encoding said lower level data according to a second error correcting code to produce second encoded data;

means for interleaving and arranging said second encoded data such that it is spread over time; and

means for utilizing said plurality of tones to transmit said upper level data and said second encoded data.

64. An apparatus for arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding a first portion of said data according to a first error correcting code to produce first encoded data;

means for encoding a second portion of said data according to a second error correcting code to produce second encoded data;

means for arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

means for arranging said second encoded data according to rows, wherein each row corresponds to one of said plurality of codes; and

means for utilizing said plurality of modulation codes to transmit said first encoded data and said second encoded data.

65. An apparatus for arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding a first portion of said data according to a first error correcting code to produce first encoded data;

means for encoding a second portion of said data according to a second error correcting code to produce second encoded data;

means for arranging said first encoded data according to time-wise columns, each of said time-wise columns corresponding substantially to a symbol period;

means for interleaving and arranging said second encoded data such that it is spread over time; and

means for utilizing said plurality of modulation codes to transmit said first encoded data and said second encoded data.

66. An apparatus for arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, said modulation codes corresponding to rows and said symbol periods corresponding to columns, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding said data according to a first error correcting code to produce first encoded data;

means for interleaving said first encoded data to produce an interleaved data stream;

means for splitting said interleaved data stream into upper level data and lower level data;

means for arranging said upper level data along columns;

means for encoding said lower level data according to a second error correcting code to produce second encoded data;

means for arranging said second encoded data according to rows; and

means for utilizing said plurality of modulation codes to transmit said upper level data and said second encoded data.

67. An apparatus for arranging and transmitting data in a CDMA system having a plurality of modulation codes, each modulation code adapted to transmit a data symbol during a symbol period, said modulation codes corresponding to rows and said symbol periods corresponding to columns, comprising:

means for inputting data comprising a plurality of data symbols;

means for encoding said data according to a first error correcting code to produce first encoded data;

means for interleaving said first encoded data to produce an interleaved data stream;

means for splitting said interleaved data stream into upper level data and lower level data;

means for arranging said upper level data along columns;

means for encoding said lower level data according to a second error correcting code to produce second encoded data;

means for interleaving and arranging said second encoded data such that it is spread over time; and

means for utilizing said plurality of modulation codes to transmit said upper level data and said second encoded data.

68. A method of transmitting data of at least two users to provide inter-user interleaving in a multitone system having a plurality of tones, each tone at a different frequency and adapted to transmit a data symbol during a symbol period, the method comprising the following steps:

inputting user data comprising a plurality of data symbols;

encoding a first portion of said user data according to a first code to produce first encoded data;

encoding a second portion of said user data according to a second code to produce second encoded data, said first and second codes being different;

arranging said first encoded data according to time-wise columns of symbols to be transmitted, each of said time-wise columns corresponding substantially to a symbol period;

arranging said second encoded data according to rows of symbols to be transmitted, wherein each row corresponds to one of said plurality of tones;

delaying the transmission of successive ones of said symbols to be transmitted; and

utilizing said plurality of tones to transmit the symbols to be transmitted.